1617

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS & INTERFERENCES

In re Application of: **H. Tanaka, et al.**

Serial No.: **09/818,692** Art Unit: **1617**

Filed: **March 28, 2001** Examiner: **L. Wells**

For: **Cosmetics Comprised Of A Flaky, Fine Powder And Method Of Production**

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

TRANSMITTAL OF APPEAL BRIEF

Attached hereto is three copies of an appeal brief in the above-identified application.

Also attached is our check in the amount of $330.00 as the fee for filing the appeal brief.

Respectfully submitted,

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Date: September 29, 2004

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APPEAL BRIEF

Now comes Appellant and hereby appeals the final rejection of Claims 1-17 and 23 herein for the reasons set forth hereinafter.

(1) Real Party In Interest

The real party in interest of the present application is Catalysts & Chemicals Industries Co., Ltd., a corporation of Japan, whose post office address is 6-2, Ohtemachi 2-chome, Chiyoda-ku, Tokyo 100, Japan, to whom the present application has been assigned.

(2) Related Appeals And Interferences

There are no other appeals or interferences known to Applicants' legal representative, or assignee, which will directly affect or be directly affected by or have a bearing upon the board's decision in this appeal.

(3) Status Of Claims

The status of all claims in the application are as follows:

(a) Claims cancelled: 8-22 and 24-26;

(b) Claims allowed: None;

(c) Claims rejected: 1-17 and 23.

(d) Claims on appeal: 1-17 and 23.

(4) Status Of Amendments

A response was filed after the final rejection on July 23, 2004. However, it is not known at the present time whether this response after final rejection was entered or considered. The response filed after the final rejection does not propose the amendment of any presently pending claim.

(5) Summary Of Invention

The present invention concerns covering a surface of a flaky substance as a base with non-porous spherical particles to provide a means for reducing the glossiness of the base caused by the irregular reflection of light on its surface and improving the slipperiness of the base, and to thus provide a new, and at the same time, useful, flaky, fine powder as well as a method for production thereof (Specification, page 3, lines 2-6; said Specification being the substitute specification filed on July 16, 2001, and the drawings being the substitute drawings filed on July 16, 2001).

It is deemed preferable in this case to read the claims on the Specification in order to enable the Board to more quickly determine where the claimed subject matter is described in the

application.

A method is provided for in claim 1 of producing a flaky fine powder, which comprises

adding alkoxysilane and/or silicic acid solution to a dispersion containing a flaky or scaly base and spherical silica particles, and

immobilizing said spherical silica particles on the surface of said said flaky or scaly base by hydrolyzing said alkoxysilane and/or gelling said silicic acid solution,

said flaky or scaly base having a thickness of about 1 μm or less and is selected from the group consisting of mica, talc and platelet shaped silica, and said spherical silica particles comprise SiO_2 or a mixture of SiO_2 with one or more of Al_2O_3, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm,

(Specification, page 3, lines 11-21; page 4, lines 15-24; page 5, lines 1-5; page 7, lines 17-24; and page 14, lines 7-10 from the bottom of page

wherein the permittivity (ε) of said dispersion is in the following range:

$$15 \leq \varepsilon \leq 80$$

(Specification, page 5, lines 22-24); and the ion concentration (N) of the sum of cations and anions in said dispersion satisfies the following conditions:

(a) 200 ppm $\leq N \leq 5*10^4$ ppm, when ε is 15,

(b) $3*10^4$ ppm $\leq N \leq 2*10^5$ ppm, when ε is 80, and

(c) N is in a quadrilateral area formed by A (15, 200), B (15, $5*10^4$), C (80, $2*10^5$) and D (80, $3*10^4$) in the (X,Y) coordinate system with the X axis for the permittivity (ε) (-) and the Y axis for the ion concentration (N) (ppm), when $15 \leq \varepsilon \leq 80$. (Specification, page 6, lines 1-8).

In this same method in claim 2, the process is carried out in a dispersion medium comprising an organic solvent and/or water, to adhere said spherical silica particles on the surface of said flaky or scaly base. (Specification, page 5, lines 9-13).

In claim 3, a flaky, fine powder is provided comprising a flaky or scaly base having a thickness of about 1 μm or less and selected from the group consisting of mica, talc and platelet shaped silica; and spherical silica particles comprised of SiO_2 or a mixture of SiO_2 with one or more of Al_2O_3, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, and said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm and covering the surface of said flaky or scaly base. (Specification, page 3, lines 11-20; page 4, lines 19-24; and page 5, lines 1-5).

Claim 4 calls for the flaky, fine powder according to claim 3, wherein the spherical silica particles are immobilized on the surface of said flaky or scaly base by a hydrolysate of alkoxysilane and/or silica gel. (Specification, page 7, lines 17-24).

In claim 5, a method is provided of producing a flaky fine powder comprising:

dispersing (a) a flaky or scaly base having a thickness of about 1 μm or less selected from the group consisting of mica, talc and platelet shaped silica, and (b) spherical silica particles comprised of SiO_2 or a mixture of SiO_2 with one or more of $A1_20_3$, $Zr0_2$, Mg0, Zn0, $Ce0_2$ or Fe_20_3, in a dispersion medium,

said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm,

said spherical silica particles being deposited on a surface of said flaky or scaly base in said dispersion medium, and a flaky, fine powder being obtained by filtering, washing and drying the obtained dispersion. (Specification, page 3, lines 11-21; page 4, lines 22-24; page 5, lines 1-

5; page 7, lines 17-24; page 9, lines 17-21; and page 14, lines 7-10 from bottom of page),

wherein the permittivity (ε) of said dispersion is in the following range:

$$15 \leq \varepsilon \leq 80$$

(Specification, page 5, lines 22-24), and the ion concentration (N) of the sum of cations and anions of said dispersion satisfies the following conditions,

200 ppm $\leq N \leq 5*10^4$ ppm, when ε is 15,

$3*10^4$ ppm $\leq N \leq 2*10^5$ ppm, when ε is 80, and

N is in a quadrilateral area formed by A (15, 200), B (15, $5*10^4$), C (80, $2*10^5$) and D (80, $3*10^4$) in the (X,Y) coordinate system with the X axis for the permittivity (ε) (-) and the Y axis for the ion concentration (N) (ppm), when $15 \leq \varepsilon \leq 80$ (Specification, page 6, lines 1-8).

The method of claim 6 calls for immobilizing said spherical silica particles on the surface of said flaky or scaly base by adding alkoxysilane and/or silicic acid solution to said dispersion. (Specification, page 7, lines 17-18; and page 8, lines 6-10).

The method of claim 7 calls for immobilizing said spherical silica particles on said surface of said flaky or scaly base by adding alkoxysilane to said dispersion and hydrolysing said alkoxysilane. (Specification, page 7, lines 23-24).

In the method of claim 8, the alkoxysilane is a compound having the formula:

$$Si(OR)_4,$$

wherein R is an alkyl group with a carbon number of 1 to 7. (Specification, page 8, lines 1-5).

The method of claim 9 calls for immobilizing said spherical silica particles on the surface of said flaky or scaly base by adding silicic acid solution to said dispersion, and gelling said solution. (Specification, page 8, lines 22-24; and page 9, lines 1-8).

Claim 10 calls for a flaky, fine powder comprising a flaky or scaly base having a thickness of about 1 μm or less selected from the group consisting of mica, talc and platelet shaped silica; and spherical silica particles comprised of SiO_2 or a mixture of SiO_2 with one or more of Al_2O_3, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, and said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm which adhere to the surface of said flaky or scaly base. (Specification, page 3, lines 11-14; page 4, lines 15-24; page 5, lines 1-5; page 7, lines 17-24; page 14, and lines 7-10 from bottom of page).

In claim 11 the spherical silica particles of claim 10 are immobilized on said flaky or scaly base by hydrolysate of alkoxysilane, and/or silica gel. (Specification, page 7, lines 17-24; page 8, lines 22-24; and page 9, lines 1-8).

Claim 12 provides for a cosmetic comprising a flaky fine powder produced according to the method of claim 5. (Specification, page 9, lines 22-24).

Claim 13 calls for a cosmetic comprising a flaky fine powder produced according to the method of claim 1. (Specification, page 9, lines 22-24).

Claim 14 calls for a cosmetic comprising a flaky fine powder produced according to the method of claim 2. (Specification, page 9, lines 22-24).

Claim 15 calls for a cosmetic comprising a flaky, fine powder as claimed in claim 3. (Specification, page 9, lines 22-24).

Claim 16 calls for a cosmetic comprising a flaky, fine powder as claimed in claim 4. (Specification, page 9, lines 22-24).

Claim 17 calls for a cosmetic comprising a flaky, fine powder as claimed in claim 10. (Specification, page 9, lines 22-24).

Claim 23 calls for a method of producing a flaky fine powder comprising:

hydrolyzing tetraethoxysilane in a dispersion containing mica flakes having a thickness of about 1 μm or less, to thereby precipitate the silica and immobilize said silica on the surface of said mica flakes non-porous spherical silica particles having an average particle size of 0.05-3 μm,

wherein the permittivity ε of said dispersion is in the following range; (Figs. 2 and 6-11; Specification, Example 1, pages 11-14)

$$15 \leq \varepsilon < 80$$

(Specification, page 5, lines 22-24), and the ion concentration (N) of the sum of cations and anions in said dispersion satisfies the following conditions,

(a) 200 ppm $\leq N \leq 5*10^4$ ppm, when ε is 15,

(b) $3*10^4$ ppm $\leq N \leq 2*10^5$ ppm, when ε is 80, and

(c) N is in a quadrilateral area formed by A (15, 200), B (15, $5*10^4$), C (80, $2*10^5$) and D (80, $3*10^4$) in the (X,Y) coordinate system with the X axis for the permittivity (ε) (-) and the Y axis for the ion concentration (N) (ppm), when $15 \leq \varepsilon \leq 80$. (Specification, page 6, lines 1-8).

(6) Issues Presented

(a) Whether Claims 1-17 and 23 are unpatentable under 35 U.S.C. § 103 over Seo, et al. in view of Golz-Berner, et al.

(b) Whether the present application is entitled to the filing date of the corresponding Japanese priority application, Application No. H02-216403, filed August 16, 1990, and PCT Application, PCT/JP91/08087, filed August 15, 1991. Certified English translations of both of these Japanese applications were filed in this case.

(7) Grouping Of Claims

Set forth below are the separate groupings of claims.

Group I – Method Claims 1, 2, 5-9, and 23. These claims should be grouped together because they relate to a method of producing a flaky, fine powder.

Group II – Composition Claims 3, 4, 10 and 11 should be grouped together because they relate to a flaky, fine powder composition. Appellants consider these composition claims to be separately patentable from the method claims.

Group III – Claims 12-17 directed to a cosmetic composition. These claims should be grouped together because they relate to a cosmetic composition containing a flaky, fine powder. Appellants consider these compositions to be separately patentable from the method claims of Group I, and from the composition claims of Group II above, because in addition to the flaky, fine powder of Group II, they also contain a cosmetic type of ingredients.

In view of the differences in the subject matter of claims in Group I – III, above, these claims

do not stand or fall together and, instead, each group of claims should be considered separately.

(8) Argument

Appellants respectfully contend that in the rejection under 35 U.S.C. § 103 as being unpatentable over Seo, et al. in view of Golz-Berner, et al. the following errors occurred:

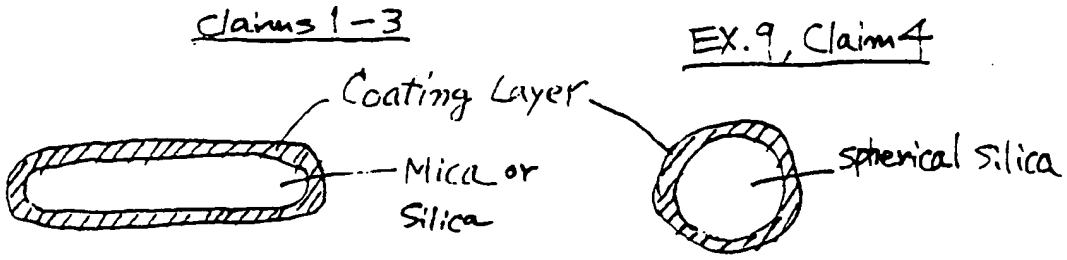
(1) On page 3, lines 2 and 3, of the final rejection the Examiner erroneously stated that

"Second, it is respectfully pointed out that Seo, et al. teaches a coating

layer comprising particles which have a spherical form deposited on a base".

Applicants respectfully urge that the Examiner's interpretation of the Seo, et al. reference is erroneous, and respectfully point out that Seo, et al. do not teach a coating layer comprising particles which have a spherical form deposited on a base. On the contrary, Seo, et al. teach amorphous glassy coating layers of metal oxides such as silica

Morover, Seo, et al. do not disclose a coating layer comprised of silica particles which have a spherical form. Perhaps the Examiner is making reference to Example 9 in Seo, et al. in which spherical silica of 5 – 10 μm in diameter were added to amorphous silica powder, calcium carbonate, zinc carbonate, aluminum dioxide and yellow ferric oxide. However, this example, it is respectfully submitted, produces a product as shown below.



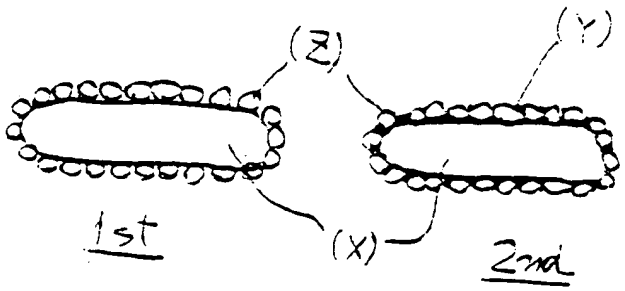
It can be seen that the spherical silica constitutes the substrate upon which is formed an amorphous glassy coating layer. The amorphous glassy coating layer in no way constitutes spherical silica particles. It is therefore clear that the Examiner has erred in interpreting the primary reference since this reference does not disclose a coating layer of silica particles having a spherical form. The Examiner's confusion with regard to Seo, et al. is spelled out in the paragraph bridging pages 3 and 4 of the final Office Action mailed March 23, 2004.

Appellants maintain that the spherical silica disclosed in Seo, et al. is not the coating layer, but rather the inorganic cosmetic pigment base. It is clear from Example 9 in Seo, et al. that spherical silica particles of 5 – 10 μm in diameter were coated with a combination of metal oxides including amorphous silica powder to produce the amorphous glassy coating layer which is described throughout Seo, et al. In particular, Claim 1 and Claim 23 recite that the coating layer as being formed of an amorphous glassy coating. Appellant does agree with the Examiner that Seo, et al. teach a coating layer containing silica. However, it is believed that silica was incorporated in the coating layer in an amorphous form and, when processed, forms the

"amorphous glassy coating layer of metal oxides having a lattice structure" (See Claims 1 and 23).

An object of the present invention is to provide a means for reducing the glossiness of flaky, fine cosmetic bases caused by the irregular reflection of light on the surface thereof, to improve the slipperiness of the base, and to provide a means of production thereof. To achieve these objects, the present invention provides a flaky, fine powder comprising a flaky base (X), and non-porous spherical silica particles (Z) covering the surface of (X).

In addition, a second flaky, fine powder is provided comprising a flaky base (X), a hydrolysate of alkoxysilane and/or silica gel (Y), and non-porous spherical silica particles (Z). The surface of (X) is covered by (Y) and (Z), as shown below:



The coating layer of the present invention comprises particles which have a spherical form deposited on a base having a flat grain size (Fig. 2 and 3). This results in the surface of the flaky substrate being uneven. Thus, the flaky, fine base substance, such as mica, has the unexpected and

superior property of homogeneous light distribution as illustrated in Figs. 6-8 and 10, i.e., the glossiness is reduced and reflected light on the uneven surface of the substance is not partial to a certain angle and is distributed homogeneously.

The unexpected properties of the product of the present invention is illustrated in the new subject matter in this CIP application in Example 1, page 11, line 4, and Fig. 11, said subject matter proving that the silica particles are spherical and non-porous, and that there is no air void at the surface or in the spherical silica. The newly added subject matter in this CIP application clearly establishes non-obvious patentable differences between the claimed product and the prior art compositions. It is therefore respectfully submitted that the submission of this evidence clearly rebuts any prima facie case of obviousness based on the prior art of record.

The Examiner correctly pointed out on page 3, paragraph 1, of the final Office Action, that Seo, et al. fail to teach either the average particle size of the silica coating particles or the non-porous nature thereof, both factors of which are important in achieving the object of the present invention. In addition, as discussed above, the spherical silica disclosed in Seo, et al. is NOT the coating layer of the base, but rather the inorganic cosmetic pigment base.

The Examiner made several errors concerning the secondary reference of Golz-Bernier, et al. and the Examiner's reasons for combining the references.

First, the secondary reference of Golz-Berner, et al. fails to disclose the composition called for in the claims herein. Instead, an agglomerate is disclosed, which does not and cannot perform the functions of the composition of the present invention, which comprises a base coated with smaller non-porous spherical particles as shown below:

The Examiner correctly recognized the failure of both of the cited references to disclose the permittivity of the dispersion, as claimed herein. (Office Action mailed 07/16/2003; page 4, lines 7-9). In an effort to obviate this lack of disclosure, the Examiner maintains that this claimed element of permittivity is inherent in the cited references because the combination of references teach the instant dispersion. However, as pointed out above, in fact neither of the cited references taken individually or in combination disclose the dispersion and composition called for herein. Specifically, there is no disclosure whatsoever of "a flaky, fine powder comprising a flaky or scaly base having a thickness of about 1 μm or less and selected from the group consisting of mica, talc and platelet shaped silica; and spherical silica particles comprised of SiO_2 or a mixture of SiO_2 with one or more of Al_2O_3, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, and said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm and covering the surface of said flaky or scaly base", as called for in claim 3 herein. It is therefore believed that the Examiner's conclusion of inherency is in error.

It is respectfully submitted that neither of the cited references disclose non-porous spherical

silica particles having an average particle size of 0.05-3 μm deposited on and immobilized on a flaky or scaly base having a thickness of about 1 μm or less, which provides the permittivity of the dispersion called for herein, and which is produced by the methods claimed herein. On the contrary, that teaching or suggestion come only from the present application, and constitutes an important element or aspect of the present invention.

Further, the reasons for combining the references is erroneous in the office action mailed 07/16/2003, wherein the examiner argued that it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine these references

> "--- because of the expectation of achieving a cosmetic composition
>
> that does not deagglomerate and that imparts homogeneous spreading
>
> to the skin and that provides good reflection of UV radiation".

However, these properties of the composition referred to by the examiner are not the properties being sought in the composition of the present invention. On the contrary, the Specification herein makes it clear on page 3, lines 2-6, that the object of the present invention include covering a surface of a flaky substance as a base with non-porous spherical particles to provide a means for reducing the glossiness of the base caused by the irregular reflection of light on its surface and improving the slipperiness of the base and thus provide a new, and at the same time, useful flaky, fine powder as well as a method for production thereof. Graphs and data concerning the reflected light distribution presented in Figs. 6-10 show reflected light distributions of the scattering of reflected light when light is irradiated on Samples A to E.

Therefore, the Examiner's reasons for combining the references is fatally flawed, and there

is not a logical reason to combine the references in the manner suggested by the Examiner. Simply put, the Examiner is suggesting that the references can be combined to achieve certain types of properties of the final product, but those are not the properties that are being sought in the composition claimed herein. Therefore, it is believed that the Examiners reasons for combining the references are unwarranted.

In conclusion, in view of these deficiencies of the cited references, it is respectfully submitted that it would NOT have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of the two cited references to arrive at the methods and compositions called for in the claims herein

In addition, the Examiner erred in refusing to accord the present application the filing date of the Japanese priority applications of PCT application PCT/JP91/08087, filed August 15, 1991, and Japanese Patent Application No. H02-216403, filed August 16, 1990. In particular, although the non-porous character of the non-porous spherical silica particles described in the Japanese priority application is shown in the instant CIP application as being an inherent property, the Examiner erred in continuing to require an *ipsis verbis* description of the "non-porous" property of the spherical silica particles in the prior filed priority applications to enable Appellant to claim the benefit thereof.

Specification, Example 1, page 11-14, of the present continuation-in-part application presents data and calculations proving that the spherical silica particles described in the original Japanese application HO2-216403, filed August 16, 1990, are inherently non-porous.

This board in Ex parte Yamaguchi, 6 USPQ 2d 1805, 1807 (PTO Bd. Pat. Appeals & Int'f, 1987) pointed out that

> "35 U.S.C. § 119 requires only that the invention be disclosed in the benefit application in such a manner as to comply with the first paragraph of § 112 and be the same invention as that disclosed in the later application. It does not require that the claimed invention be described in the same way, that is, in ipsis verbis to satisfy the description requirement ---[F]rom a standpoint of patent law, a compound and all of its properties are inseparable. They are one and the same --- [T]he X-ray diffraction spectrum, like the graphic formulae, the chemical nomenclature, etc., is merely a symbol by which the compound can be identified, classified and compared.").

Further, even though an application which adequately describes reactions which will produce a compound does not necessarily adequately describe that compound, the PTO must give reasons why a description of a compound which is not disclosed in *ipsis verbis* is insufficient. In re Edwards, et al., 568 F2d 1349, 196 USPQ 465 (CCPA, 1978). In the present case, the Examiner failed to state such a reason.

In addition, this board has held that disclosing low carbon steel is an inherent disclosure of steels which have a melting point below 2800°F. Ex parte Cure, 215 USPQ 567 (POBA, 1982). Further, the stereo configuration of a compound otherwise fully identified along with a method for its production and characterizing analytical data is an inherent physical characteristic which can be added by amendment after filing, In re Nathan, et al., 140 USPQ 601 (CCPA, 1964), or a subsequently filed application without affecting the applicant's right to the benefit of his parent application. Spero v. Ringold, et al., 153 USPQ 726 (CCPA, 1967). In this case, Applicant has

properly demonstrated and claimed the inherent non-porous properties of the spherical silica particles.

In view of the above authorities, appellant respectfully submits that in this case, spherical silica particles and all of their properties are inseparable. This also applies to the non-porous nature of these spherical silica particles. Therefore, since Appellant provided in the original Japanese parent application the method of producing these spherical silica particles, which are inherently non-porous as proven by the data presented in this continuation-in-part application, Appellant respectfully submits that this application should be entitled to the filing date of the Japanese priority application. This conclusion is warranted since the disclosure of making the non-porous spherical silica particles satisfies the requirements of 35 U.S.C. §112 and 35 U.S.C. § 119. Consequently, it is respectfully urged that the Examiner erred in requiring an *ipsis verbis* description in the Japanese priority application regarding the non-porous property of the spherical silica particles of the present invention.

As previously discussed in the grouping of claims, Appellant respectfully urges that the claims on appeal do not stand or fall together. In addition, although these claims are grouped together by the Examiner in the final rejection, it is respectfully urged that the claims are separately patentable. For example, there is no disclosure whatever in either Seo, et al. or Golz-Berner, et al. of a method of producing a flaky, fine powder having a permittivity and sum of cations and anions in the dispersion which satisfies the conditions set forth in the claims herein to produce a flaky substance having a reduced glossiness on the base caused by irregular reflection of light on its surface. On the contrary, that method of producing the desired particles is set forth only in the

present application.

In addition, with respect to the Group II claims, 3, 4, 10 and 11, these claims, it is urged, are separately patentable since they are directed solely to the composition which is nowhere disclosed in either of the references relied upon by the Examiner. Neither of the references, as the Examiner admits, disclose or suggest the flaky, fine powder having non-porous spherical silica particles on the surface which have the permittivity and concentration of sum of the cations and anions to satisfy all of the conditions required by the claims. Further, as pointed out above, the Examiner erred in understanding properties being sought in the composition of the present invention as discussed above. For the above reasons, it is believed that Group II – claims 3, 4, 10 and 11 are separately patentable from the method claims in Group I.

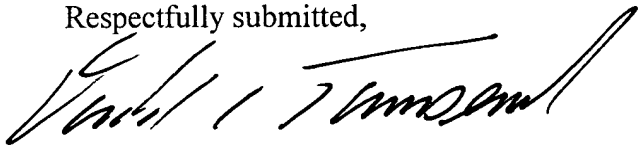
Further, it is believed that the compositions in Group III – claims 12-17, are separately patentable because they are directed to a cosmetic composition. Although the cosmetic composition, claims 12-17, contain the flaky, fine substance defined in claims 3, 4, 10 and 11, it is respectfully submitted that the addition of cosmetic ingredients, and the use of this composition in a cosmetic composition, is unobvious. The Examiner has failed to produce any teaching or suggestion in either of the references cited in the final rejection which would suggest that the composition of a flaky substance with non-porous spherical particles on its surface and having reduced glossiness of the base caused by irregular reflection of light on its surface would be suitable for use in a cosmetic. On the contrary, that teaching or suggestion comes solely from the present application, and constitutes an important element or aspect of the present invention.

CONCLUSION

In view of the foregoing, it is respectfully submitted that the Examiner erred in interpreting Seo, et al. relied upon in the final rejection and in the examiner's reasons for combining the references in the rejection under 35 U.S.C. § 103 is also erroneous.

Further, as demonstrated above, the Examiner erred in requiring an *ipsis verbis* description of the non-porous properties of the spherical silica particles described in the Japanese priority application. Thus, as a matter of law, it is believed that the requirements of 35 U.S.C. § 119 are satisfied, as the Japanese priority application complies with 35 U.S.C. §112, first paragraph, which does not require an *ipsis verbis* description of the invention. For these reasons, it is respectfully urged that the final rejection is fatally flawed, and this appeal should be summarily granted.

Respectfully submitted,



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(9) Appendix

The claims on appeal are set forth hereinafter.

1. A method of producing a flaky fine powder, comprising:

adding alkoxysilane and/or silicic acid solution to a dispersion containing a flaky or scaly base and spherical silica particles, and

immobilizing said spherical silica particles on the surface of said said flaky or scaly base by hydrolyzing said alkoxysilane and/or gelling said silicic acid solution,

said flaky or scaly base having a thickness of about 1 μm or less and is selected from the group consisting of mica, talc and platelet shaped silica, and said spherical silica particles comprise SiO_2 or a mixture of SiO_2 with one or more of Al_2O_3, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm,

wherein the permittivity (ε) of said dispersion is in the following range:

$$15 \leq \varepsilon \leq 80$$

and the ion concentration (N) of the sum of cations and anions in said dispersion satisfies the following conditions:

(a) 200 ppm $\leq N \leq 5*10^4$ ppm, when ε is 15,

(b) $3*10^4$ ppm $\leq N \leq 2*10^5$ ppm, when ε is 80, and

(c) N is in a quadrilateral area formed by A (15, 200), B (15, $5*10^4$), C (80, $2*10^5$) and D (80, $3*10^4$) in the (X,Y) coordinate system with the X axis for the permittivity (ε) (-) and the Y axis for the ion concentration (N) (ppm), when $15 \leq \varepsilon \leq 80$.

2. A method of producing a flaky fine powder comprising:

(a) dispersing a flaky or scaly base having a thickness of about 1 μm or less selected from the group consisting of mica, talc and platelet shaped silica, and spherical silica particles

comprised of SiO_2 or a mixture of SiO_2 with one or more of Al_2O_3, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, in a dispersion medium comprising an organic solvent and/or water, to adhere said spherical silica particles on the surface of said flaky or scaly base, and

(b) adding alkoxysilane and/or silicic acid solution to the obtained dispersion,

said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm and immobilized on the surface of said flaky or scaly base by hydrolyzing said alkoxysilane and/or gelling said silicic acid solution,

wherein the permittivity (ε) of said dispersion is in the following range[;]:

$$15 \leq \varepsilon \leq 80$$

and the ion concentration (N) of the sum of cations and anions in said dispersion satisfies the following conditions:

(a) 200 ppm $\leq N \leq 5*10^4$ ppm, when ε is 15,

(b) $3*10^4$ ppm $\leq N \leq 2*10^5$ ppm, when ε is 80, and

(c) N is in a quadrilateral area formed by A (15, 200), B (15, $5*10^4$), C (80, $2*10^5$) and D (80, $3*10^4$) in the (X,Y) coordinate system with the X axis for the permittivity (ε) (-) and the Y axis for the ion concentration (N) (ppm), when $15 \leq \varepsilon \leq 80$.

3. A flaky, fine powder comprising a flaky or scaly base having a thickness of about 1 μm or less and selected from the group consisting of mica, talc and platelet shaped silica; and spherical silica particles comprised of SiO_2 or a mixture of SiO_2 with one or more of Al_2O_3, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, and said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm and covering the surface of said flaky or scaly base.

4. The flaky, fine powder according to claim 3, wherein said spherical silica particles are immobilized on the surface of said flaky or scaly base by a hydrolysate of alkoxysilane and/or silica gel.

5. A method of producing a flaky fine powder comprising:

dispersing (a) a flaky or scaly base having a thickness of about 1 μm or less selected from the group consisting of mica, talc and platelet shaped silica, and (b) spherical silica particles comprised of SiO_2 or a mixture of SiO_2 with one or more of $A1_2O_3$, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, in a dispersion medium,

said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm,

said spherical silica particles being deposited on a surface of said flaky or scaly base in said dispersion medium, and a flaky, fine powder being obtained by filtering, washing and drying the obtained dispersion,

wherein the permittivity (ε) of said dispersion is in the following range:

$$15 \leq \varepsilon \leq 80$$

and the ion concentration (N) of the sum of cations and anions of said dispersion satisfies the following conditions,

200 ppm $\leq N \leq 5*10^4$ ppm, when ε is 15,

$3*10^4$ ppm $\leq N \leq 2*10^5$ ppm, when ε is 80, and

N is in a quadrilateral area formed by A (15, 200), B (15, $5*10^4$), C (80, $2*10^5$) and D (80, $3*10^4$) in the (X,Y) coordinate system with the X axis for the permittivity (ε) (-) and the Y

axis for the ion concentration (N) (ppm), when $15 \leq \varepsilon \leq 80$.

6. The method according to claim 5, further comprising immobilizing said spherical silica particles on the surface of said flaky or scaly base by adding alkoxysilane and/or silicic acid solution to said dispersion.

7. The method according to claim 5, further comprising immobilizing said spherical silica particles on said surface of said flaky or scaly base by adding alkoxysilane to said dispersion and hydrolysing said alkoxysilane.

8. The method according to claim 7, wherein said alkoxysilane is a compound having the formula:

$$Si(OR)_4,$$

wherein R is an alkyl group with a carbon number of 1 to 7.

9. The method according to claim 5, further comprising immobilizing said spherical silica particles on the surface of said flaky or scaly base by adding silicic acid solution to said dispersion, and gelling said solution.

10. A flaky, fine powder comprising a flaky or scaly base having a thickness of about 1 μm or less selected from the group consisting of mica, talc and platelet shaped silica; and spherical silica particles comprised of SiO_2 or a mixture of SiO_2 with one or more of $A1_2O_3$, ZrO_2, MgO, ZnO, CeO_2 or Fe_2O_3, and said spherical silica particles being non-porous and having an average particle size of 0.05-3 μm which adhere to the surface of said flaky or scaly base.

11. The flaky, fine powder according to claim 10, wherein said spherical silica particles are immobilized on said flaky or scaly base by hydrolysate of alkoxysilane, and/or silica gel.

12. A cosmetic comprising a flaky fine powder produced according to the method of claim 5.

13. A cosmetic comprising a flaky fine powder produced according to the method of claim 1.

14. A cosmetic comprising a flaky fine powder produced according to the method of claim 2.

15. A cosmetic comprising a flaky, fine powder as claimed in claim 3.

16. A cosmetic comprising a flaky, fine powder as claimed in claim 4.

17. A cosmetic comprising a flaky, fine powder as claimed in claim 10.

23. A method of producing a flaky fine powder comprising:

hydrolyzing tetraethoxysilane in a dispersion containing mica flakes having a thickness of about 1 μm or less, to thereby precipitate the silica and immobilize said silica on the surface of said mica flakes non-porous spherical silica particles having an average particle size of 0.05-3 μm,

wherein the permittivity ε of said dispersion is in the following range;

$$15 \leq \varepsilon < 80$$

and the ion concentration (N) of the sum of cations and anions in said dispersion satisfies the following conditions,

(a) 200 ppm $\leq N \leq 5*10^4$ ppm, when ε is 15,

(b) $3*10^4$ ppm $\leq N \leq 2*10^5$ ppm, when ε is 80, and

(c) N is in a quadrilateral area formed by A (15, 200), B (15, $5*10^4$), C (80, $2*10^5$) and D

$(80, 3*10^4)$ in the (X,Y) coordinate system with the X axis for the permittivity (ε) (-) and the Y axis for the ion concentration (N) (ppm), when $15 \leq \varepsilon \leq 80$.